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Spot-Size Ratio Departure and Misalignment of Photoreceptor Cones in Early Age-Related Macular Degeneration

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Abstract: When the ratio of intensities for both axial and peripheral entries for equal photometric effects is plotted against the pupil entry position a Stiles Crawford function (SCF) is obtained. As the SCF is modified in various retinal pathologies and especially a disturbance in the mechanism of photoreceptor alignment is observed in some forms of age-related macular degeneration (AMD), the waveguide approach of SCE is adopted to study AMD. In this approach, the spot-size ratio is evaluated for healthy and early AMD eye to attempt an answer of the question: can the disturbed visual perceptions of patients with early stages of AMD be accounted for by improper alignment of macular cones? And we have got the results that, in fact, in early AMD the misalignment of cones lead to complete elimination of retinal directionality as revealed from a fixed spot-size ratio for all pupil entry positions of light. Also, the directionality of retina is much more sensitive to misalignment of cones than to cone death.

Keywords: Spot-size ratio; Photoreceptor cone; age-related macular degeneration, Misalignment.

[Full Paper]